

Proposed Plan for the Naval Reactors Facility



IDAHO DEPARTMENT
OF HEALTH AND WELFARE
DIVISION OF
ENVIRONMENTAL QUALITY



Industrial Waste Ditch (Operable Unit 8-07), and Landfill Areas (Operable Units 8-05 and 8-06)

Idaho National Engineering Laboratory

Public Comment Period - April 12 to May 12, 1994

(Editors Note: Technical and administrative terms are used throughout this Proposed Plan. When these terms are first used, they are printed in ***bold italics***. Explanations of these terms, document references, and other helpful notes are provided in the margins.)

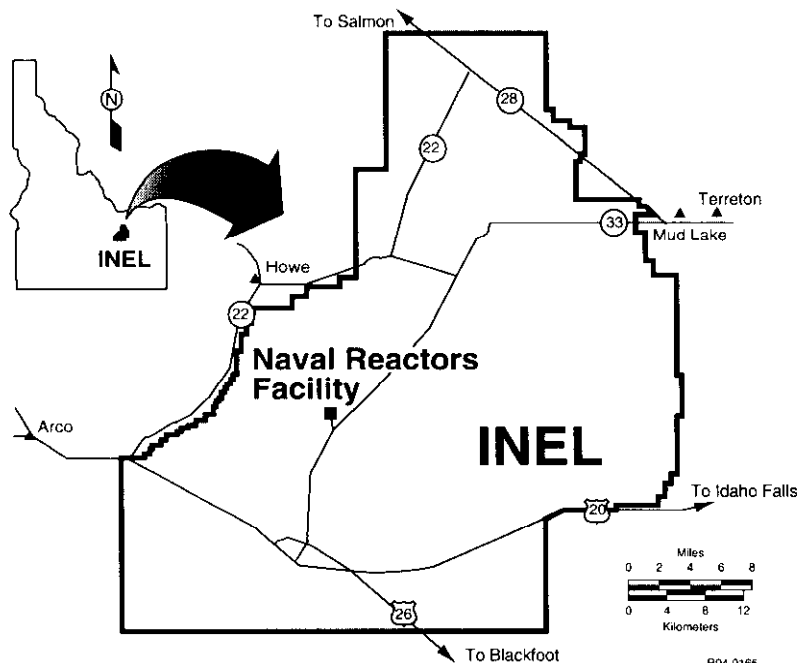


Figure 1. The Idaho National Engineering Laboratory showing the location of the Naval Reactors Facility.

Introduction

The purpose of this Proposed Plan is to summarize information and seek comments on ***remedial action alternatives*** for TWO different types of environmental investigations performed at the Naval Reactors Facility. A ***Remedial Investigation*** of the Naval Reactors Facility Industrial Waste Ditch (Operable Unit 8-07) was performed due to known discharges of waste water containing organic and inorganic constituents. ***Track 2*** investigations were performed on nine suspected historical landfill areas (Operable Units 8-05 and 8-06) based on past disposal practices of wastes similar to those found in municipal landfills. The reasons for combining multiple units in one Proposed Plan are to present the findings of the investigations in an efficient and timely manner. The necessary information on how to participate in the public comment process is provided below.

A Remedial Investigation was performed on the Industrial Waste Ditch (Operable Unit 8-07) because of known discharges of solutions containing low concentrations of

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Mall/Office Sessions*

Pocatello - Pine Ridge Mall
Tuesday, April 12

Twin Falls - INEL Regional Office
Thursday, April 14

Sessions with Public Meetings*

Idaho Falls - Grand Teton Mall
Monday, April 18

Boise - Boise Centre on the Grove
Wednesday, April 20

Moscow - Palouse Empire Mall
Thursday, April 21

* See page 14 for details.

remedial action alternatives - the options available for a site cleanup.

remedial investigation - an environmental investigation which identifies the nature and extent of contamination at a site. Also provides an assessment of the potential risks associated with a site.

Track 2 - an investigation of an area which does not have sufficient data available to make a decision concerning the level of risk or to select or design a remedy. Field data collection may be necessary.

feasibility study - an engineering study which provides a full analysis of cleanup alternatives based on information gathered during the remedial investigation.

Presumptive Remedy - the preferred technology for a certain category of site, based on historical patterns of remedy selection and EPA's scientific and engineering evaluation. In this case, a soil cover and monitoring.

Record of Decision - a public record documenting the final determination of the selected remedy. Records of Decision follow the consideration of public comment, and apply to both CERCLA and the National Environmental Policy Act; INEL CERCLA decisions are signed by the Regional Administrator of EPA Region 10, DOE, and the state of Idaho.

Responsiveness Summary - the part of the Record of Decision which summarizes and provides responses to comments received on a proposed action for a site during the public comment period.

Details on the alternatives developed for this project can be found in the *Remedial Investigation/Feasibility Study for the Industrial Waste Ditch*, or the *Summary Reports and Feasibility Study for the Landfill Units (Operable Units 8-05 and 8-06)*. The information supporting the recommended remedial actions is available for review at the INEL Information Repositories listed on page 9.

organic and inorganic substances from 1953 through the present time. The Industrial Waste Ditch receives nonradioactive waste water from various operations at the Naval Reactors Facility. No hazardous constituents have been discharged since 1980, with the exception of high and low pH ion exchange regeneration solutions from the water treatment facility which were halted in 1985. A risk assessment was completed for the contaminants detected, which include barium, chromium, copper, mercury, nickel, silver, and zinc. It was determined that there are no unacceptable risks to human or ecological receptors from the ditch. Therefore, no *feasibility study* was completed.

The landfill units received nonradiological wastes from the Naval Reactors Facility prior to 1970. These wastes consisted of office trash, construction debris, cafeteria garbage, waste oils, chromate wastes, and small quantities of miscellaneous chemicals such as paints and solvents. A review of historical records and interviews with former employees indicate that the waste was placed in unlined trenches or pits, burned, and the areas subsequently backfilled.

Track 2 investigations were performed for Operable Units 8-05 and 8-06, which include nine areas suspected of having been used as landfills. These areas were grouped together because they have similar characteristics. The sites designated as 8-05-1, Field Area North of S1W, 8-05-51, West Refuse Pit, and 8-06-53, East Refuse Pit and Trenching Area, have been identified for implementation of a municipal landfill *Presumptive Remedy*. The remaining six sites were determined to be "no action" sites.

Impact to the Underlying Aquifer

The metals in the soils and surface water associated with the Industrial Waste Ditch (Operable Unit 8-07) are not expected to affect the Snake River Plain Aquifer. This is based on contaminant concentrations in the perched water system adjacent to the ditch, a comparison of current upgradient and downgradient ground water constituent concentrations, and the lack of any significant migration over the last 30 years.

The potential impact to the Snake River Plain Aquifer from the landfill units (Operable Units 8-05 and 8-06) was determined using estimated contaminant concentrations. Calculations based on these estimates indicate that adverse effects to the aquifer from the landfills is unlikely. However, to address the uncertainty which is a part of any investigation, impact to the aquifer will be further evaluated by monitoring.

Agency Involvement

This proposed plan is prepared in accordance with the public participation requirements identified under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly called Superfund. In addition, the proposed plan provides the remedial action alternatives proposed by the United States Department of Energy Naval Reactors Idaho Branch Office, Environmental Protection Agency Region 10 (EPA), and the Idaho Department of Health and Welfare (IDHW) (hereinafter referred to as "the agencies").

Recommended Alternatives

No action is recommended for the Industrial Waste Ditch (Operable Unit 8 07). This is based on the results of the remedial investigation and risk assessment. There is no evidence that the discharges to the Industrial Waste Ditch have had a significant environmental impact, or might adversely affect the aquifer in the future.

The recommended remedial action alternative for landfill units 8-05-1, -51, and 8-06-53 is containment and ground water monitoring. Deed restrictions would be obtained to limit the use of these areas. No action is recommended for sites 8-05-59; 8-06-35, -36, -48, -49, and -50. A further description of these sites begins on page 8.

Community Acceptance

Community acceptance is one of the criteria the agencies must evaluate during the process of selecting a remedy. The only way the agencies have to gauge the degree of community acceptance is to 1) open dialogue with citizens concerning the results of the investigation, and 2) encourage citizens to participate by commenting on the proposed remedial actions for the Naval Reactors Facility Industrial Waste Ditch (Operable Unit 8-07), or the Landfill Units (Operable Units 8-05 and 8-06). This interaction is critical to the CERCLA process and to making sound environmental decisions. Although this plan identifies the agencies' proposed actions, the public is encouraged to review and comment on any of the alternatives, not just the preferred alternative.

The actual selection of a remedy cannot be made until after the comments received during the public comment period have been reviewed and analyzed. When the results are known, the agencies will consider all public comments on this proposed plan in preparing the **Record of Decision**. Depending on comments received, the final remedial action plan presented in the Record of Decision could be different from the preferred alternative. All written and verbal comments will be summarized and responded to in the **Responsiveness Summary** section of the Record of Decision, which is scheduled to be completed by October 1994.

History of the Naval Reactors Facility

The INEL site (Figure 1) was established in 1949 as the National Reactor Testing Station by the United States Atomic Energy Commission as a site for building, testing, and operating nuclear reactors, fuel processing plants, and support facilities with maximum safety and isolation. In 1974, the area was redesignated as the Idaho National Engineering Laboratory to reflect the broad scope of engineering activities conducted there.

The Naval Reactors Facility (Figure 2) was established in 1949 as a testing site for the Naval Nuclear Propulsion Program. It is located on the west-central side of the Idaho

How You Can Participate

Whether you are new to the INEL and are reading this type of document for the first time, or you are familiar with the Superfund process, you are invited to:

- **Read** this proposed plan and review additional documents in the Administrative Record file
- **Call** a regional INEL office (see page 9) to ask questions, request information, or make arrangements for a briefing
- **Attend** a public meeting or mall display session listed on page 14 and give verbal comments
- **Submit** written comments (see postage-paid comment form on back cover) by May 12, 1994
- **Contact** state of Idaho or EPA Region 10 project managers (see page 12)

More INEL Information

The 1994 INEL Site-Specific Plan (230 pages) and a summary of the plan (36 pages) contain information on INEL's mission, and highlight the major programs of environmental restoration, waste management, and opportunities for public involvement. Call one of the regional INEL offices listed on page 9 to request a copy of the plan or summary, or visit an INEL Information Repository to review them in binder 400.



Figure 2. Aerial photograph of the Naval Reactors Facility.

National Priorities List - a formal listing of the nation's worst hazardous waste sites as established by CERCLA that have been identified for possible remediation. Sites are ranked by the EPA based on their potential for affecting human health and the environment.

Federal Facility Agreement and Consent Order - an agreement between the EPA, the state of Idaho, and the DOE to evaluate waste disposal sites at the INEL, and perform remediation, if necessary.

Waste Area Group - one of the ten permanent management areas at the INEL.

Track 1 - an area or group of areas which is believed to have a low probability of risk. Sufficient information is available to evaluate the area and recommend a course of action.

Interim Action - An action taken to mitigate a clear, unacceptable risk at a site when there is sufficient data to assess the risk and select an action.

Operable Unit - an area or areas with distinct characteristics or similar wastes.

Detailed information on the Industrial Waste Ditch investigation can be found in the Administrative Record under "**Naval Reactors Facility Exterior Industrial Waste Ditch Remedial Investigation/Feasibility Study, Operable Unit 8-07**, Volumes I through VI."

background values - the concentrations of naturally occurring elements in soils which have not been affected by site operations.

adsorbed - the attachment of the molecules of a contaminant to the surface of site soils.

National Engineering Laboratory, approximately 50 miles west of Idaho Falls, Idaho. The Naval Reactors Facility is operated by Westinghouse Electric Corporation for the Office of Naval Reactors of United States Department of Energy.

Construction on the Submarine Thermal Reactor prototype (S1W) at the Naval Reactors Facility began in 1951, and the prototype was shut down in 1989. The A1W prototype was constructed in 1958, and was shut down in January, 1994. The S5G prototype was constructed in 1965, and is scheduled for shut down in 1995. The prototypes have been used to train sailors for the nuclear navy, and for research and development purposes. The Expended Core Facility, which receives, inspects, and conducts research on naval nuclear fuel, was constructed in 1958.

In 1989, the INEL was placed on the *National Priorities List*. In 1991, the agencies signed the *Federal Facility Agreement and Consent Order* under the Comprehensive Environmental Response, Compensation, and Liability Act. This agreement defined the decision process for conducting assessments and investigations of potential waste disposal areas. Although the Naval Reactors Facility did not individually qualify for the National Priorities List, it was included in the Agreement due to its co-location at the Idaho National Engineering Laboratory, and was designated as *Waste Area Group 8*.

Within each Waste Area Group, all areas with a potential for past waste disposal were identified and categorized according to perceived risk. The categories are *Track 1*, *Track 2*, *Interim Action*, and Remedial Investigation/Feasibility Study. Those areas with similar wastes and migration pathways were grouped into *Operable Units*. This Proposed Plan addresses one Remedial Investigation/Feasibility Study project (Operable Unit 8-07, Industrial Waste Ditch), and two Track 2 investigations (Operable Units 8-05 and 8-06, Landfill Areas) (see Figure 3).

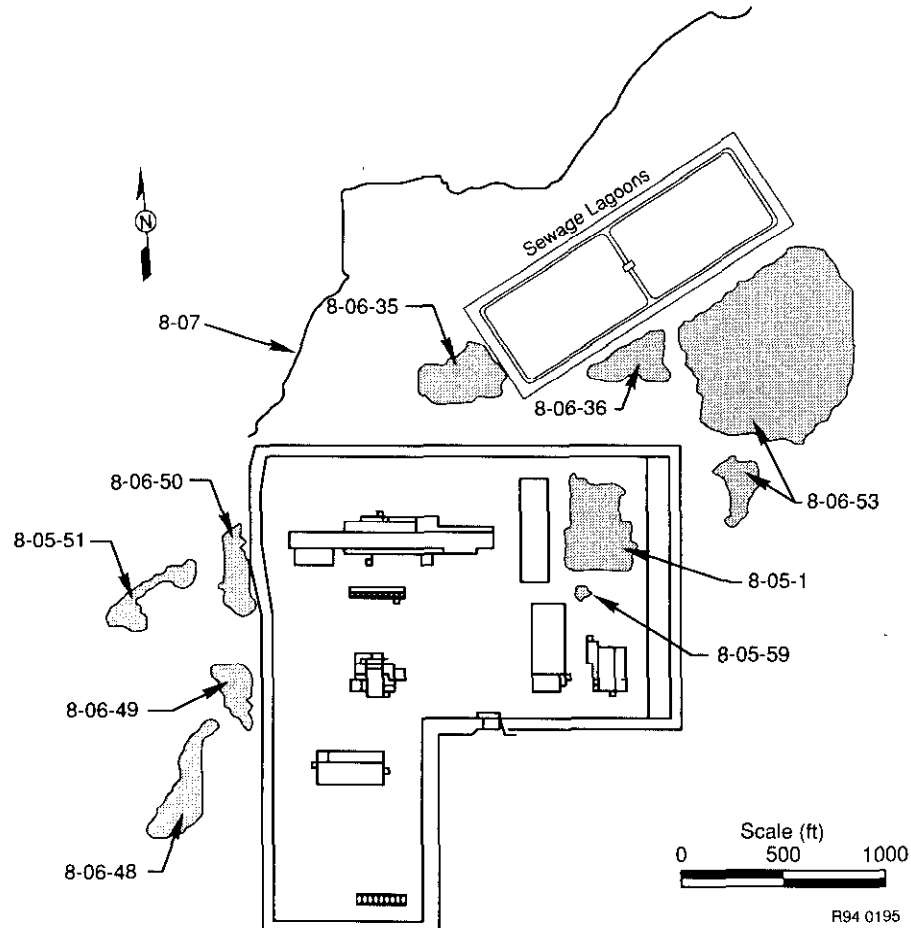


Figure 3. Map showing units described

Industrial Waste Ditch (Operable Unit 8-07)

The Naval Reactors Facility Industrial Waste Ditch (Operable Unit 8-07) is a 3.2 mile long channel which receives nonradioactive waste water discharges from various Naval Reactors Facility operations. This proposed plan includes only that portion of the Industrial Waste Ditch outside the Naval Reactors Facility perimeter fence. The interior portion is being investigated separately as Operable Unit 8-09, and will be included in the Naval Reactors Facility Comprehensive Proposed Plan. Waste water has been discharged to the Industrial Waste Ditch since 1953, and the ditch has become a significant source of water for plants and wildlife in the desert around the Naval Reactors Facility. The channel of the ditch has been modified and dredged periodically. The dredged sediments were placed on the banks parallel to the ditch. Due to recent reductions in operations at the Naval Reactors Facility, water is rarely present beyond the first 1.2 miles of the channel.

Water has historically been the primary constituent of the discharge stream, with low concentrations of organic and inorganic constituents comprising a minor portion of the discharge. The discharge prior to 1980 was primarily composed of rain and snow runoff containing trace metals and hydrocarbons, cooling water containing dilute acid and corrosion-inhibiting heavy metal compounds, industrial waste water containing traces of oil, acidic and basic ion exchange regenerant solutions from water treatment, and laboratory reagents. No hazardous constituents have been discharged since 1980, with the exception of high and low pH ion exchange regeneration solutions from the water treatment facility. This process was discontinued in 1985 following construction of a neutralization facility. The Naval Reactors Facility continues to discharge nonradioactive, nonhazardous waste water to the Industrial Waste Ditch. This discharge consists primarily of secondary cooling water, neutralized ion exchange regeneration solutions, and storm water runoff. This waste water is monitored, and procedural and engineering controls ensure that no hazardous wastes are discharged to the ditch.

Design of the Remedial Investigation

The Remedial Investigation reviewed existing data, performed extensive sampling to characterize the ditch sediments and dredge pile soils, and evaluated the nature and extent of contaminants. Data was also obtained to characterize the geologic and hydrologic conditions in the vicinity of the ditch, and to determine the depth of migration of contaminants.

Results of the Remedial Investigation

The Remedial Investigation showed that current and estimated future contaminant concentrations in ground water are below the Federal drinking water standards identified in the Safe Drinking Water Act. The ditch sediments and dredge pile soils contain some metal constituents which exceed the INEL average **background values**. In most cases, the migration of metals is limited because the solutions discharged had generally low concentrations of metals, and the ditch sediments and shallow subsurface soils **adsorbed** most of the discharged metals. This binding of metals in the upper soil layers tends

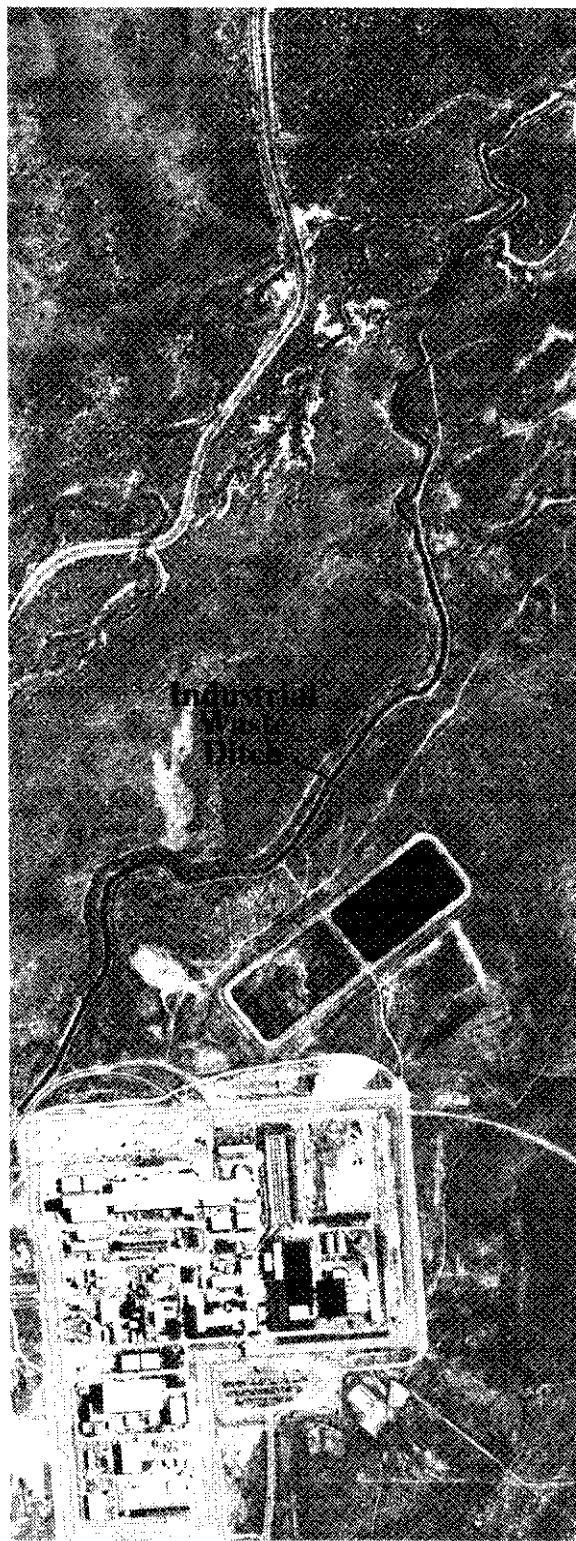


Figure 4. Photograph of the Industrial Waste Ditch at the Naval Reactors Facility.

Table 1. Summary of baseline risk assessment results for the Industrial Waste Ditch.

Receptor	Source	Primary Contributing Exposure Route	Noncarcinogenic Risk (Hazard Index)	Carcinogenic Risk
Background Levels for Workers	Overall Sediments, Dredge Pile Soils	Ingestion of Ground Water	0.06	1.65×10^{-6}
Current Workers	"	"	0.06	"
Future Workers	"	"	0.07	"
Background Levels for Rural Residents	Overall Sediments, Dredge Pile Soils	Ingestion of Fruits and Vegetables	0.75	1.4×10^{-5}
Residents in Rural Setting	"	"	1.37	"
	Soils from Outfall to 500 Feet	"	1.32	"
	Soils from 3000 Feet to 3300 Feet	"	1.99	"
	Soils from 5500 Feet to 6500 Feet	"	1.94	"
Background Levels for Agricultural Residents	Overall Sediments, Dredge Pile Soils	Ingestion of Fruits and Vegetables	0.80	1.4×10^{-5}
Residents in Agricultural Setting	"	"	1.03	"
	Soils from Outfall to 500 Feet	"	1.16	"
	Soils from 3000 Feet to 3300 Feet	"	2.13	"
	Soils from 5500 Feet to 6500 Feet	"	2.23	"

baseline risk assessment - an assessment required by CERCLA to evaluate potential risks to human health and the environment. This assessment estimates risks/hazards associated with existing and/or potential human and environmental exposures to contaminants at an area.

reasonable maximum exposure - the highest exposure to a receptor that is reasonably expected to occur at a site.

to preclude further migration. Additional data on contaminant migration is available in the *Naval Reactors Facility Exterior Industrial Waste Ditch Remedial Investigation/ Feasibility Study Operable Unit 8-07*, Volume VI, Section 5, page 5-6.

Summary of Risk Assessment

A **Baseline Risk Assessment** evaluated the risk to human and ecological receptors in present and future exposure scenarios. These results are summarized in Table 1. Using conservative assumptions from EPA guidance documents, the **reasonable maximum exposure** to individuals in occupational, residential, and agricultural settings was calculated. The risk to residential receptors was calculated using four different sets of constituent concentrations: one set based on the overall concentrations in the ditch sediments and dredge piles, and three sets determined for localized areas which have elevated levels of some constituents. These three areas which exhibit higher concentrations were found in the first 500 feet, from 3,000 to 3,300 feet, and from 5,500 to 6,500 feet from the **outfall** of the ditch.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with a toxicity **reference dose (RfD)** derived for a similar exposure period. The ratio of exposure to the RfD is called a hazard quotient. The sum of all hazard quotients associated with a particular area is the **hazard index**. The baseline risk assessment for the entire length of the IWD determined that the potential for noncarcinogenic effects is 1.37 for future residential receptors, and 1.03 for future agricultural receptors. This can be compared to the background potential of 0.75 for future residential receptors and 0.8 for future agricultural receptors. The maximum hazard index calculated was 2.23 for a future agricultural receptor residing 5500 to 6500 feet downstream from the outfall of the Industrial Waste Ditch. This hazard index is considered to be an acceptable level of risk because of the conservative nature of the calculations. The calculation of the Hazard Index involves the use of uncertainty factors to ensure a large safety margin is present. For example, the calculations for the ingestion of homegrown fruits and vegetables in the residential and agricultural scenarios assumed that the contaminant mercury was in the most toxic form (methylmercury), although this is unlikely. Also, a hazard index of 2.23 does not imply that the corresponding likelihood or severity of an adverse effect is 2.23 times greater. The hazard index is not directly proportional to the risk.

Carcinogenic effects are calculated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the potential carcinogen. The highest carcinogenic **risk** calculated is 1.6×10^{-5} for future residential and agricultural receptors. This is similar to the background risk, and is within the range determined to be acceptable (1×10^{-4} to 1×10^{-6}) in accordance with the **National Contingency Plan**. The calculations indicate that Operable Unit 8-07 does not present a significant risk to plant, animal, or human receptors.

Recommendation for the Industrial Waste Ditch

Based on the results of the remedial investigation and risk assessment, no action is recommended for the Industrial Waste Ditch (Operable Unit 8-07). There is no evidence that the discharges to the ditch have had a significant environmental impact, or might measurably affect the aquifer in the future.

Landfill Units (Operable Units 8-05 and 8-06)

The landfill units include nine areas suspected to have been used as landfill sites prior to 1970 (Figure 3). These areas are believed to have similar wastes, migration paths, and risk factors. Table 2 summarizes the information on these areas, which were investigated through the Track 2 process.

Upon review of historical background information during scoping, it was decided that there was sufficient evidence of waste disposal at four of the nine sites (i. e., 8-05-01, -51, -59, and 8-06-53) to require further field investigation. It appears that no sources of contamination remain at 8-06-35, -36, -48, -49, or -50. Consequently, these sites were determined to pose no unacceptable risks to receptors.

Method of Investigation

The investigation of the four landfill units (8-05-1, -51, -59, and 8-06-53) was designed to focus on determining the boundaries of the landfills, the depth of the cover, the potential for ground water contamination, and particulate and/or organic vapor release. Due to the presumed **heterogenous** nature of the landfill contents, the investigation did not include **intrusive sampling** into the landfill waste material. The amounts of hazardous materials that may be present in the landfill waste were estimated based on existing data, historic photographs, employee interviews, and a records search.

outfall - the place where an effluent is discharged.

reference dose - (RfD) a toxicity value representing the acceptable upper limit of a substance. The RfD is used to determine non-carcinogenic effects.

hazard index - a numerical value that indicates the potential for the most sensitive individuals to be adversely affected by a noncarcinogenic constituent. When the hazard index exceeds 1, further considerations and risk management decisions must be considered.

risk - the probability of developing cancer, and/or non-cancerous adverse health effects.

National Contingency Plan (NCP, implemented by 40 CFR 300 et seq.) - Regulations implementing response actions under CERCLA, including the procedures for emergency response to releases of hazardous substances.

Detailed information on the Landfill Units can be found in the Administrative Record under "**Naval Reactors Facility Track 2 Investigation Operable Unit 8-05**" and "**Naval Reactors Facility Track 2 Investigation Operable Unit 8-06**."

heterogenous - consisting of dissimilar elements or ingredients.

intrusive sampling - sampling the waste within the landfill.

Table 2. Summary of Landfill Units (8-05 and 8-06).

Area	Primary Uses/Wastes	Dates of Operation	Dimensions	Appearance/Artifacts
8-05-1	Similar to municipal landfill, construction debris and refuse such as petroleum products, small quantities of paints and solvents, cafeteria wastes	1951-1960	350' x 450' (107 x 137 meters), depth of refuse 4-25' (1.2-7.6 meters)	Eastern portion has construction rubble piles about 3' (1 meter) high
8-05-51	Similar to municipal landfill, construction debris and refuse such as petroleum products, small quantities of paints and solvents, cafeteria wastes, material staging area and construction debris disposal	1957-1963	450' x 100-175' (137 meters x 30.5 to 53.4 meters)	Covered disposal trench approximately 250' x 15-20' wide and 10-15' deep (76.2 x 4.6 - 6.1 x 3 - 4.6 meters deep)
8-05-59	Possible landfill/burn pit	1951-1953	75' x 100' (22.9 x 30.5 meters), depth estimated at 20' (6.1 meters)	No evidence of a landfill or burn pit has been found. Soil samples were collected in 1991
8-06-35	Construction debris disposal	1960-1972	300' x 400' (91.4 x 121.9 meters)	Mounded area containing gravel, sand, silty soil, concrete, wood, and scrap metal
8-06-36	Construction debris disposal	1960-1972	Triangular; base about 300' and altitude of 500' (91.4 x 152.4 meters)	Very little surface debris, some natural sagebrush remains
8-06-48	Construction debris disposal, and material staging	1956-1964	650' long x 75' to 175' wide (198.1 x 22.9 to 53.3 meters)	Scrap wood and metal. Soil sampling included excavating a trench on the eastern side of the site in 1988 for evaluation as a building site. Much of area is undisturbed
8-06-49	Construction staging area	1961-1963	350' long x 25' to 150' (106.7 x 7.6 to 45.7 meters)	Scrap wood and metal and concrete debris, no older vegetation remains, soil cover appears unnatural
8-06-50	Construction material staging and parking	1956-1959	450' long x 50' to 150' (137.1 x 15.2 to 45.7 meters)	No older vegetation present, no evidence of disposal
8-06-53	Similar to municipal landfill, cafeteria wastes, construction debris and refuse such as petroleum products, small quantities of paints and solvents	1956-1970	900' x 1200' (274.3 x 365.8 meters)	Disturbed vegetation and soil, tire tracks

volatile organic compounds - a group of organic compounds that have a tendency to vaporize readily.

Inventories were not kept of the waste which was disposed of in the landfill areas. However, based on the number of major construction projects during the time period that these areas were in use, a considerable amount of the waste was probably construction debris. After 1971, the quantity of construction debris disposed of probably decreased due to the reduced number of construction projects. In addition, a smaller volume of waste was generated and sent to the Naval Reactors Facility landfills prior to 1965, since only two prototype plants were operating. Table 3 provides information about waste generated after 1971, and an estimate of the waste generated prior to that time.

The three wastes of concern are waste oil, solvents, and chemicals. The primary compounds of concern for waste oils and solvents are **volatile organic compounds**. Chemicals which may have been disposed of in the landfills include chromate compounds and low concentrations of silver nitrate and mercuric nitrate in solution. Chromates were used for water treatment, and silver and mercuric nitrate solutions were used in laboratory analyses. The quantities and concentrations of these sub-

stances were estimated using the known volumes of metals which had been disposed of after 1971. Other hazardous wastes, including paints, asbestos containing materials, polychlorinated biphenyls, pesticides, and lead, may have been buried in the landfill areas prior to 1970.

Radiological wastes were not a concern in the evaluation of landfill contents because the segregation of waste streams and extensive control over radioactive materials at the Naval Reactors Facility precluded burial on the NRF site.

Geophysical and soil gas surveys were conducted to determine the overall boundaries of the waste disposal areas, and if existing, the boundaries of specific trenches in these areas. **Magnetometer** surveys were conducted in 8-05-1, 8-05-51, and 8-06-53. Soil gas samples (from 8-05-1, -51, -59, and 8-06-53) were analyzed for benzene, ethylbenzene, toluene, xylenes, tetrachloroethene (at 8-06-53 only), and 1,1,1-trichloroethane. Portable gas detection instruments were also used to monitor for methane, volatile organic compounds, combustible gases, and hydrogen sulfide. Because metal surface debris was found at 8-05-51 and 8-06-53, surface soil samples were collected and analyzed for heavy metals.

Investigation Results

The results of the magnetometer survey in Operable Unit 8-05-1 were inconclusive due to magnetic interference, but the suspected location of an abandoned trench in Operable Unit 8-05-51 was confirmed which was developed by the agencies to provide a uniform assessment and risk evaluation process. The magnetometer survey of Operable Unit 8-06-53 identified six anomalies which may represent debris-filled trenches or buried debris.

Soil gas surveys detected volatile organic compounds associated with solvents at Operable Units 8-05-1, -59, and 8-06-53, and further defined the boundaries of the landfills. Soil samples from Operable Units 8-05-51 and 8-06-53 found concentrations of heavy metals which exceeded the background Idaho National Engineering Laboratory **threshold** level.

Summary of Site Risk

Operable Units 8-05-1, -51, -59, and 8-06-53 were evaluated in accordance with the INEL Track 2 Guidance Document which was developed by the agencies to provide a uniform assessment and risk evaluation process. The risk assessment focused on possible risks and impacts resulting from conditions associated with the site now and in the future since the landfill contents were not fully characterized. As part of the Track 2 investigation, both limited quantitative and qualitative assessments of the risk were performed. Because limited data was available, risk calculations were only performed for the constituents identified by the soil gas analysis. Risk due to the hazardous constituents in the landfills was also estimated based on historic information. There is a high degree of uncertainty due to the heterogenous nature of the landfill contents and dependence on historic records in the assumptions. As a result, the need for remedial action is based on:

- The potential for releases of contaminants disposed of in the landfill to the environment in the future;
- The toxic nature of the materials disposed (e.g., chlorinated solvents);
- The lack of significant containment; and
- The limited number of remedial alternatives available for landfills.

An ecological risk assessment was not included in the Track 2 analysis. However, the protectiveness of the presumptive remedy for human health concerns will reduce the potential risk for contact with the landfill contents for ecological receptors as well. No acute threats to sensitive animal species such as birds and bats, or sensitive plant species were detected. A detailed ecological risk assessment will be conducted in the

INEL Information Repositories

INEL Technical Library
DOE-ID Public Reading Room
1776 Science Center Drive
Idaho Falls, ID 83415
(208) 526-1185

INEL Pocatello Office
1651 Al Ricken Dr.
Pocatello, ID 83201
(208) 233-4731

INEL Twin Falls Office
233 2nd Street North, Suite B
Twin Falls, ID 83301
(208) 734-0463

INEL Boise Office
816 West Bannock, Suite 306
Boise, ID 83702
(208) 334-9572

University of Idaho Library
University of Idaho Campus
Moscow, ID 83843
(208) 885-6344

Shoshone Bannock Library
HRDC Building
Bannock and Pima Streets
Fort Hall, ID 83203
(208) 238-3882

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**Environmental Restoration
Information Office**
530 S. Ashbury
Moscow, ID
(208) 882-6668

Geophysical survey - determination of the characteristics of the subsurface using the instruments and methodology of physics and engineering.

Magnetometer - an instrument that measures magnetic field intensity, and is used to detect buried waste.

threshold - the concentration of a substance above which the risks should be evaluated.

Table 3. Estimate of landfill wastes generated at the Naval Reactors Facility.

Waste Type	Form	Average Annual Volume after 1971 (Cubic meters/year)	Estimated Average Annual Volume before 1971 (Cubic meters/year)
Office trash	Solid	4,656.0	3,119.0
Construction debris	Solid	1,571.0	1,052.0
Municipal waste	Solid	1,090.0	664.0
Waste oil	Liquid	24.0	16.0
Paint, thinner, solvents	Liquid	0.14	0.03
Acidic, basic, or metal-based solutions used in plant operations or analytical chemistry procedures	Liquid	2.2	1.3
Chromate solutions	Liquid	2.5	1.7
Chemicals used for water treatment	Solid	0.6	0.4
Totals		7,346.44	4,854.43

Naval Reactors Facility Comprehensive Remedial Investigation and Feasibility Study.

Remedial Action Goals

The following expectations were used to develop appropriate remedial action goals: treatment should be used to address relatively high and immediate threats; engineering controls should be used for waste that poses a relatively low long-term threat or where treatment is impracticable; and institutional controls should be used as appropriate to prevent or limit exposure to hazardous substances.

The Naval Reactors Facility landfill areas were evaluated as municipal landfills based on the types of wastes which were identified. The volume of industrial and/ or hazardous waste co-disposed with municipal waste at CERCLA municipal landfills varies from site to site as does the amount of information available concerning disposal history. It is generally impractical to fully characterize, excavate, and/or treat the source area of municipal landfills, due to the uncertainty about the landfill contents.

Containment has been established as the presumptive remedy for CERCLA municipal landfills. Presumptive remedies are the preferred technologies for common categories of sites, based on historical patterns of remedy selection and EPA's scientific and engineering evaluation of performance data on technology implementation. The objective of the presumptive remedies initiative is to use the program's past experience to streamline site investigation and speed up selection of cleanup actions. Over time, presumptive remedies are expected to ensure consistency in remedy selections and reduce the cost and time required to clean up similar types of sites. Presumptive remedies are expected to be used at all appropriate sites except under unusual site-specific circumstances. Containment is accomplished by a combination of measures, such as a landfill cap and monitoring.

The goals of the remedial actions are to protect human health and the environment from potential adverse effects from landfill area contaminants that could occur in, or be transported by ground water, soil, or air. The site specific remedial action objectives established for 8-05-1, -51, and 8-06-53 are:

- Comply with all ***Applicable, Relevant and Appropriate Requirements***;
- Reduce infiltration and leaching of contaminants;

Applicable or Relevant and Appropriate Requirements (ARARs) - "Applicable" requirements mean those standards, criteria, or limitations promulgated under federal or state law that are required specific to a substance, pollutant, contaminant, action, location, or other circumstance at a CERCLA site. "Relevant and Appropriate" requirements mean those standards, requirements, or limitations that address problems or situations sufficiently similar to those encountered at the CERCLA site such that their use is well suited to that particular site.

- Ensure that the Snake River Plain Aquifer downgradient from these areas has no constituents above drinking water standards;
- Control runoff and erosion; and
- Prevent direct contact with the landfill contents.

Summary and Comparison of Alternatives

Three remedial action alternatives were identified:

Alternative 1 - No Action

The landfill contents would remain in place. No sampling or monitoring would be performed.

Alternative 2 - Containment with Native Soil Cover

The landfill contents would remain in place. Land use restriction would be implemented to limit sale and use of the property. The area would be surveyed and permanently marked. A 30 year sampling program would perform analyses of ground water and soil gases. Administrative controls would ensure that a two foot thick, uniform native soil cover is in place, and that native vegetation is sufficient to reduce erosion and provide adequate drainage.

Alternative 3 - Containment with Single Barrier Cover

The landfill contents would remain in place. Land use restriction would be implemented to limit sale and use of the property. The area would be surveyed and permanently marked. A 30 year sampling program would perform analyses of ground water and soil gases. A single barrier cap consisting of one foot of compacted native soil, two feet of clay, and at least two feet of native soil and vegetation would be installed to reduce erosion and improve drainage.

The primary applicable or relevant and appropriate requirement for landfill units 8-05-1, -51, and 8-06-53 is:

- Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (IDAPA § 16.01.05.008); (40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities").

These regulations focus on the control of hazardous waste and the regulation of air emissions that may result from any remediation activities, including the handling of residual hazardous wastes that may be generated from remediation activities, and potential dust generating activities, such as well drilling and earth moving.

Evaluation of Alternatives

Each of the alternatives was evaluated using eight of the nine evaluation criteria identified under CERCLA. The ninth criterion, community acceptance, will be evaluated using the public response to the proposed remedial actions.

Overall Protection of Human Health and the Environment

Alternatives 2 and 3 satisfy the criterion of overall protection of human health and the environment. The alternatives provide protection by reducing the risk of potential contaminant migration to the Snake River Aquifer, and by maintaining the inaccessibility of the landfill contents.

Compliance with Applicable or Relevant and Appropriate Requirements

The Applicable or Relevant and Appropriate Requirements is Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities. The landfill covers and monitoring systems described in Alternatives 2 and 3 meet the standards.

Evaluation Criteria	
Threshold Criteria:	
1. Overall Protection of Human Health and the Environment addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.	
2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) addresses whether a remedy will meet all of the ARARs under federal and state environmental laws and/or justifies a waiver.	
Balancing Criteria:	
3. Long-term Effectiveness and Permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.	
4. Reduction of Toxicity, Mobility, or Volume through Treatment addresses the degree to which a remedy employs recycling or treatment that reduces the toxicity, mobility, or volume of the contaminants of concern, including how treatment is used to address the principal threats posed by the site.	
5. Short-term Effectiveness addresses any adverse impacts on human health and the environment that may be posed during the construction and implementation period and the period of time needed to achieve cleanup goals.	
6. Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.	
7. Cost includes estimated capital and operation and maintenance costs, expressed as net present-worth costs.	
Modifying Criteria:	
8. State Acceptance reflects aspects of the preferred alternative and other alternatives that the state favors or objects to, and any specific comments regarding state ARARs or the proposed use of waivers.	
9. Community Acceptance summarizes the public's general response to the alternatives described in the Proposed Plan and in the remedial investigation/feasibility study, based on public comments received.	



IDAHO DEPARTMENT
OF HEALTH AND WELFARE
DIVISION OF
ENVIRONMENTAL QUALITY

The **Idaho Department of Health and Welfare** is one of the three agencies identified in the Federal Facility Agreement which establishes the scope and schedule of remedial investigations at the INEL. Project correspondence by the Division of Environmental Quality staff can be found in the Administrative Record for this project under Operable Units 8-05, -06, and -07.

For additional information concerning the state's role in preparing this proposed plan contact:

Dean Nygard
Idaho Department of Health and Welfare
Division of Environmental Quality
1410 N. Hilton, Boise, ID 83706
(208) 334-5860, (800) 232-4635



The **U.S. Environmental Protection Agency** is one of the three agencies identified in the Federal Facility Agreement which establishes the scope and schedule of remedial investigations at the INEL. Correspondence by the Region 10 staff concerning this project can be found in the Administrative Record under Operable Units 8-05, -06, and -07.

For additional information concerning the EPA's role in preparing this proposed plan contact:

Wayne Pierre
Environmental Protection Agency
Region 10
1200 Sixth Avenue, Seattle, WA 98101
(206) 553-7261

direct cost - the estimated dollars for equipment, construction, and operation activities to conduct a remedial action.

indirect cost - the estimated dollars for activities that support the remedial action (e.g., construction management and project management)

Long-Term Effectiveness and Permanence

Alternatives 2 and 3 provide long-term effectiveness and permanence because the cover material provides for reliable isolation of the landfill contents. A degree of risk would remain because the contents remain in place.

Reduction of Toxicity, Mobility, or Volume Through Treatment

No treatment alternatives were considered.

Short-Term Effectiveness

Alternatives 2 and 3 do not require actual handling of the landfill wastes, so there is no increase in risk.

Implementability

The remedial technologies of capping, land use restrictions, and monitoring have proven reliability in the containment of landfill contents, and are easy to implement. Alternative 3 is slightly more complex than Alternative 2.

Cost

Table 4 summarizes the cost estimate for each alternative. These cost estimates, in present dollar value, include *direct* and *indirect costs* as well as maintenance and monitoring for a 30 year period.

State Acceptance

This Proposed Plan has been prepared and issued with the concurrence of the Idaho Department of Health and Welfare.

Summary of Preferred Alternative for Landfills

Alternative 1, No Action, was rejected because it does not meet the remedial action goals of reducing contaminant migration, preventing contact with landfill contents and ensuring that the Snake River Plain Aquifer has no contaminants from the source above drinking water standards.

The preferred alternative for landfill areas 8-05-1, -51, and 8-06-53 is Alternative 2; containment with native soil cover. This action meets the presumptive remedy guidance and would be designed to:

- Comply with applicable or relevant and appropriate requirements
- Reduce infiltration and leaching of contaminants
- Control runoff and erosion
- Monitor the Snake River Plain Aquifer downgradient from these areas to ensure no contaminants are above drinking water standards
- Prevent direct contact with the landfill contents.

Alternative 2 would focus on designing and installing a 2-ft thick native soil cover which will be graded, contoured, and seeded to control erosion. This action would reduce the migration of any contaminants that may be present and meets the applicable or relevant and appropriate requirements. The areas will be surveyed and marked and land use restrictions will be implemented to prevent direct contact with the landfill contents. Soil gas and aquifer water will be monitored to detect any migration of the contaminants and to facilitate corrective action for any unexpected migration.

Both Alternative 2 and Alternative 3 meet the remedial action goals and were evaluated to be equivalent for most of the evaluation criteria. Alternative 2 was evaluated as better than Alternative 3 for cost and implementability.

Table 4. Summary of Alternative Action Costs for Landfill Units.

Cost Elements	Alternative 1 No Action	Alternative 2 Native Soil Cover	Alternative 3 Single Barrier Cover
Capital	0	\$1,614,000	\$7,125,000
Overhead and Maintenance	0	400,000	400,000
Indirect	0	12,000	12,000
Estimated Present Worth	0	\$2,026,000	\$7,537,000

Because this remedy will result in wastes remaining onsite, reviews of the monitoring data will be conducted by EPA and IDHW. This evaluation will be conducted at least every five years after the Record of Decision is signed to ensure that the remedy continues to provide adequate protection of human health and the environment.

No Action Sites

No further action is recommended for 8-06-35, -36, -48, -49 and -50. Background information suggests that these sites were used primarily as construction staging areas. Knowledge of these sites derives mostly from historic aerial photograph review in which construction type objects were visible on site soils. Most of the materials stored in these areas (as seen on historic aerial photographs) have since been removed. Sparse residual surface debris in these areas is largely non-hazardous (wood, gravel, rubble piles). Therefore, it appears that no sources of contamination remain at these sites. Consequently, these sites were determined to pose no unacceptable risks to receptors.

No further action is also recommended for 8-05-59. Although there were some positive detections of meta- and para-xylene at this site, these results were, in general, only slightly elevated above associated blank samples and were considerably lower than concentrations detected at 8-05-1. Additional support for this recommendation includes the uncertainty regarding the former disposal pit's location, the presence of a building over much of the suspected site location (debris may have been removed prior to building construction or, at least, the building may minimize infiltration across any remaining wastes), and the age and relatively short duration of waste disposal at this site (operating for 2 years from 1951 through 1953). However, because of the reported one time disposal of a significant quantity of waste oil in the pit, NRF conducted modeling to help determine the effect to groundwater of a one time release of 50,000 gallons waste oil containing hazardous constituents. The results of the modeling showed that assuming a 50,000 gallon release of waste oil, groundwater would not be adversely affected (i.e., concentrations of the representative compounds would not be expected to exceed safe drinking water standards). The results of the modeling are considered conservative because eyewitness reports indicate that the contents of the pit burned for three days which should have substantially decreased the 50,000 gallon source term.

For the reasons described above, the agencies recommend no further action at these sites.

Proposed Plan Summary

The agencies propose the following recommendations for Naval Reactors Facility operable units:

Industrial Waste Ditch Operable Unit 8-07

The results of the remedial investigation and the baseline risk assessment indicate that no unacceptable risks are present at the Naval Reactors Facility Industrial Waste Ditch



Written comments can be submitted to the
**U.S. Department of Energy Idaho
Operations Office**, and addressed to:

Mr. Dary Newbry
DOE Naval Reactors Facility Project
Manager
P.O. Box 2047
Idaho Falls, ID 83403-2047

For additional information regarding the
environmental restoration program at the
INEL, call Reuel Smith at (208)-526-6864,
or call (800)-708-2680.

(Operable Unit 8-07). Therefore, no action is recommended for this unit.

Landfill Operable Units 8-05 and 8-06

Containment, the presumptive remedy for municipal landfills, is proposed for units 8-05-1, -51 and 8-06-53. Alternative 2; containment with native soil cover, land use restrictions and a groundwater and soil gas monitoring program, is the proposed alternative for these areas. Based on the results of the review of all data available, no action is proposed for Operable Units 8-05-59, 8-06-35, -36, -48, -49 and -50.

Public Involvement Activities

As soon as you receive and review this plan, you are encouraged to call any of the phone numbers listed in this plan to contact representatives of the Department of Energy, INEL regional offices, INEL Community Relations Plan office, state of Idaho, or Region 10 of the Environmental Protection Agency. You may want to ask questions, request a briefing, or seek additional background information related to this proposed plan.

Public Involvement Sessions

Displays on the progress of the INEL Environmental Restoration Program will be set up for viewing at each of the specified locations from 10 a.m. to 9 p.m. on the date listed. Representatives from the agencies will be available to discuss concerns and issues related to this proposed plan from 4 to 9 p.m. and in Twin Falls from 4 to 7 p.m.

Verbal comments may be recorded on tape at the Pocatello and Twin Falls sessions, or written comments may be submitted during the scheduled sessions, or mailed by May 12, 1994.

Pocatello

Tuesday, April 12
Pine Ridge Mall
4155 Yellowstone Avenue

Twin Falls

Thursday, April 14
INEL Regional Office
233 2nd Street North, Suite B

A public meeting will be held in conjunction with the mall sessions at the following locations. At 6:30 p.m. there will be a presentation by the agencies, followed by a question and answer session, and an opportunity to make written and/or verbal formal public comments. **A court reporter will prepare a transcript of the public meetings, and will record public comments received.**

Idaho Falls

Monday, April 18
Grand Teton Mall-
Community Room
2300 E. 17th Street

Boise

Wednesday, April 20
Boise Centre
on the Grove
850 Front Street

Moscow

Thursday, April 21
Palouse Empire Mall
1850 West Pullman Road

Naval Reactors Facility Industrial Waste Ditch and Landfill Areas

This postage-paid comment form is provided for your convenience in submitting written comments to DOE, EPA, and state of Idaho concerning the remedial action alternatives for 1) the Industrial Waste Ditch remedial investigation, and 2) the Landfill areas. Please provide your name and mailing address if you would like to receive a copy of the Record of Decision and Responsiveness Summary that addresses public comments received on these projects. Attach additional sheets if necessary.

Name: _____

Address: _____ City: _____ State: _____ Zip: _____

Comments: _____

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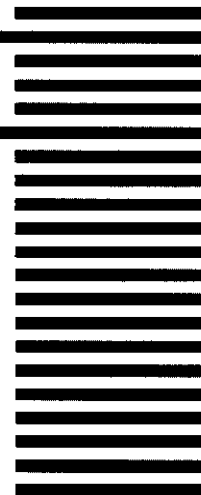
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PO BOX 2047
IDAHO FALLS ID 83403-9901



(Comments continued, attach additional pages if necessary)

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DOE Naval Reactors Facility
P.O. Box 2047
Idaho Falls, ID 83403-2047